Fiber-Optic Trunk Line Surveillance Not Requiring Splice Installation or Directly Connected Cables

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Introduction

Although fiber-optic trunk line tapping is not conceptually new, these taps, as they exist, have a number of drawbacks. A period of service outage is inevitable during the installation of such a tap which may draw attention to possibility of such an installation event. Regular inspection of trunk lines can result in the discovery and analysis of taps, resulting in the tap's removal and a diplomatic incident as soon as the secondary cable is discovered.

Abstract

Borrowing from a technique used in spinal surgery in order to remove cancerous tissue from the space between spinal cord fibers, fiber optic cable may be teased apart without severing the individual fibers by means of small robotic arms. Each of the thousands of fibers in trunk lines carry a massive quantity of data on a continual basis. Such large quantities of data are difficult to re-transmit using methods other than through fiber-optic cable, particularly in an aquatic environment.

Miniaturized magnetic momentometers may be clipped to individual fibers, encircling them as a ring on a finger. These momentometers may be used to detect the unique patterns of wavelengths of light passing through an individual fiber and to relay through a wireless system the data conveyed by the fiber without disrupting the nominal delivery of the intended fiber-optic signal.

The power required to transmit the associated data would be provided by battery and the signals conveyed to a relay, also battery-powered, which would input the received data into traditional fiber-optic cables with no direct physical connection to the trunk line it is designed to surveil. The wireless data relay may be automatically disabled on a temporary basis in the event that a submarine is detected in the vicinity of the emitters as detected by proximity fuse or space-based submarine detection platforms. In this way, the presence of an EM signal may be hidden from the targeted nation.

Once installed, these ring-configuration momentometers (RCMs) would be nearly undetectable and physical signs of the intrusion into the trunk line would be occluded.

As the machinery used to perform this cutting, teasing, tapping and annealing of the casing of the fiber would be designed to do so on an automated basis, a version of this technology may be deployed not merely from drone submarine

platforms, but manually at ground level as well in order to install taps of fiber-optics running over land.

Conclusion

Much more interesting than the submarine drones that would carry such a mechanism to a trunk line is the automated installation technology capable of automatically installing hundreds if not thousands of miniature magnetometers with the precision of a neurosurgeon. That technology could enable a new level of espionage between nations and create strategic surprise for those caught unawares.